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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/935,842	08/24/2001	Yuichiro Yamashita	35.C15702	9786

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EXAMINER

GLASS, CHRISTOPHER W

ART UNIT PAPER NUMBER

2878

DATE MAILED: 12/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

09/935,842

Applicant(s)

YAMASHITA ET AL.

Examiner

Christopher W. Glass

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 August 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Title

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Abstract

2. The abstract of the disclosure is objected to because "is" or "are" should be inserted in line 21, after "capacitors" and before "included". Correction is required. See MPEP § 608.01(b).

Drawings

3. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
4. The drawings are objected to because "recording medium 2" in Figure 7 should instead be labeled "recording medium 12", as suggested by the specification. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

5. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.
6. The disclosure is objected to because of the following informalities:

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On line 12 of page 14, "correlate" is grammatically incorrect and should read "correlated".

Line 1 of page 19 calls element 3 a "diaphragm". Previously, this reference numeral is only used to describe an "iris" (e.g. line 17 of page 18).

On lines 5,15,16, and 18 of page 21, "A401", "B402", "A501", "B502", and "B504" are recited, but the corresponding figures only show these elements labeled as 401,402,501,502, and 504, respectively. These letter designations (A and B) also appear in pages 25 (lines 22 and 25) and 26 (lines 1,3, and 7) of the disclosure.

Appropriate correction is required.

Claim Objections

7. Claims 5 and 11 recite the limitation "the photoelectric conversion" in line 9. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 112

8. Claims 5,7,11, and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In line 9 of claims 5 and 11, it is unclear as to what "the photoelectric conversion" refers to. This will be interpreted as referring to the photoelectric conversion elements of the photoelectric conversion units. Regarding claims 7 and 13, it is unclear as to how microlenses can be provided *in* the plurality of photoelectric conversion *elements*. This limitation will be interpreted as meaning that there are a plurality of microlenses which correspond to the plurality of photoelectric conversion elements of the photoelectric conversion units.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1-4, 7-10, and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,451,766 to Van Berkel.

Regarding claim 1: Van Berkel shows in Figures 1 and 3 an image pickup apparatus comprising first and second photoelectric conversion units 4, each including a plurality of photoelectric conversion elements (see Figure 3). It discloses an image forming unit (array 5 of lens elements 6) adapted to form images viewed from different points on the plurality of photoelectric conversion elements included in each of the first and second photoelectric conversion units 4, as well as a first holding unit (in each pixel, see Figure 3 and Column 5, lines 11-15) adapted to hold signals from the first photoelectric conversion unit 4, including at least the same number of capacitors 4a as the number of the plurality of photoelectric conversion elements included in the first photoelectric conversion unit 4. A second holding unit is provided (in an adjacent pixel), to hold signals from the second photoelectric conversion unit 4, the second holding unit including at least the same number of capacitors 4a as the number of the plurality of photoelectric conversion elements included in the second photoelectric conversion unit 4. A first common output line 13 reads out signals from the plurality of capacitors included in each of the first and second holding units.

Regarding claim 2: The image forming unit of Van Berkel includes microlenses 6 provided respectively in the photoelectric conversion units (see Column 2, lines 59-66).

Regarding claim 3: The image forming unit of Van Berkel is shown as further comprising third and fourth photoelectric conversion units 4, each including a plurality of photoelectric conversion elements (see Figure 3), a second common output line 13 to which signals are sequentially read out from the first and third photoelectric conversion units 4, and a third common output line 13 to which signals are sequentially read out from the second and fourth photoelectric conversion units 4. The plurality of capacitors 4a included in the first holding unit hold the signals from the second common output line 13, and the plurality of capacitors 4a included in the second holding unit hold the signals from the third common output line 13.

Regarding claims 4 and 10: In the image pickup apparatus of Van Berkel, the photoelectric conversion unit includes an amplification unit 14 for amplifying and outputting signals from the plurality of photoelectric conversion elements, the amplification being provided as a common amplification unit for the plurality of photoelectric conversion elements (see Figure 3 and Column 5, lines 25-27).

Regarding claims 7 and 13, insofar as understood: Microlenses 6 of Van Berkel are provided in an array 5, such that a microlens is disposed above and corresponds to each photoelectric conversion unit (see Column 2, lines 59-66).

Regarding claims 8 and 9: The image pickup apparatus of Van Berkel shows in Figures 1 and 3 first, second, third, and fourth photoelectric conversion units 4, each including a plurality of photoelectric conversion elements. Microlenses 6 are provided respectively in each of the

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photoelectric conversion units, for focusing light onto the plurality of photoelectric conversion elements. First and second holding units are disclosed, adapted to hold signals from respective photoelectric conversion units, each holding unit including at least the same number of capacitors **4a** as the number of the plurality of photoelectric conversion elements included in the photoelectric conversion units. Common output lines **13** sequentially read out signals from the photoelectric conversion units, and the plurality of capacitors **4a** included in the holding units (see also the above rejections of claims 1,2, and 3 above).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 5,11, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Berkel, in view of U.S. Patent No. 5,949,483 to Fossum et al. (hereafter Fossum).

Regarding claims 5 and 11: In the image pickup apparatus of Van Berkel, each of the first and second holding units includes a capacity **4a** (see also Column 5, lines 11-15) for holding at least the same number of noise signals as that of the plurality of photoelectric conversion elements. Van Berkel does not specifically teach the use of a differential circuit adapted to ~~subtract the noise signals from signals, including photoelectric conversion signals generated by~~ the photoelectric conversion units **4**. However, it is well known in the art to implement such a circuit for this purpose. Fossum shows in Figure 12 a differential circuit employed in an image

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pickup apparatus, comprising a differential amplifier **826** connected to two output lines **822**, and which “corrects for pixel induced variation” (Column 16, lines 55-56). It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide such a circuit in the apparatus of Van Berkel, by connecting two or more common output lines **13** corresponding to the photoelectric conversion units **4** to a differential amplifier, in order to subtract noise from obtained image signals obtained.

Regarding claims 14 and 15: The image pickup apparatus of Van Berkel comprises an image pickup area (see Figure 3) including a plurality of photoelectric conversion elements, and a plurality of microlenses **6** for focusing light onto the plurality of photoelectric conversion elements. Drive circuits **12** and **14** are shown in Figure 3, for reading out signals from the photoelectric conversion elements in the image pickup region. Van Berkel does not expressly show a configuration wherein one microlens is provided for every plurality of photoelectric conversion elements in a second image pickup region of the image pickup area. However, it is well known in the art to provide one microlens for a plurality of photoelectric conversion elements in an image pickup area. Fossum shows in Figure 5B one microlens **115** disposed above and corresponding to three pixels **10** of an image pickup area (see Figure 3B). It would have been obvious to one having ordinary skill in the art to modify the apparatus of Van Berkel to have such an arrangement, and also to configure the drive circuitry **12,14** to read out signals from multiple pickup areas, including those having this arrangement, in order to provide different focal settings for different imaging areas of the apparatus.

13. Claims 6 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Berkel. The image pickup apparatus of Van Berkel shows in Figure 1 an electro-optic material

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8,8a,8b disposed between the lens elements **6** and photoelectric conversion units **4**, for “applying an electrical potential across the electro-optic material **8** to adjust the effective focal length of the lens elements **6**” (Column 3, lines 3-5). It does not expressly disclose a control circuit adapted to perform focus adjustment based on a plurality of signals outputted sequentially from the common output lines **13**. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a computer or other control circuit to this apparatus, in order to actively adjust electrically the lens elements **6**, as taught by Van Berkel, to enable various focus setting adjustments or to compensate for inadequate optical arrangements of these components, and “so that the focus of the imaging device is not entirely dependent on the nature and construction of the lens elements **6**” (Column 3, lines 8-10).

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

U.S. Patent No. 5,463,216 to Van Berkel shows in Figure 2 an array of imaging elements, having drive circuitry **16, 18** and wherein each pixel has multiple elements. Figure 1 shows multiple microlenses **6** disposed above an array of corresponding imaging elements **4**.

U.S. Patent No. 5,471,515 to Fossum et al. concerns an image pickup apparatus, and shows in Figure 5 a layer **110** of microlenses **115** provided over photoelectric conversion elements **10**, each of which are shown by Figure 3 as comprising a differential amplifier for reducing fixed pattern noise in the pixel output.

U.S. Patent No. 5,426,292 to Bird et al. shows in Figure 1 an image pickup apparatus comprising a photoelectric conversion element **4** and a storage capacitor in each pixel of an array of imaging

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elements, common output lines (e.g. $m+3$), column amplifiers 81, and driving/decoding circuitry 7,8. Figure 8 shows the use of a microlens array 16.

U.S. Patent Nos. 6,137,535 and 6,141,048 to Meyers show in Figures 1A and 5, respectively, embodiments of image pickup apparatus which comprises lenslet arrays provided over an array of photoelectric conversion elements.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher W. Glass whose telephone number is 703-305-1980. The examiner can normally be reached 9:30am-6:00pm, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached at 703-308-4852. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

cg
December 12, 2002


STEPHONE ALLEN
PRIMARY EXAMINER